Advance Program

This Program is as complete and accurate as was possible at press time. It may contain errors, and some changes and additions are expected before the Final Program is printed for the Conference. For example, the process of clearance, required for certain papers, may result in unforeseen delays prior to final scheduling. Titles and abstracts of papers planned for the Concurrent Session on Instrumentation and High-Speed Photography to be held Thursday afternoon will appear in the Final Program. If very brief Conference attendance has to be planned to hear only one session, or a specific paper or papers, members are advised to inquire the week before the Technical Conference by telephoning the Society Headquarters in New York (212 TN 7-5410) or to Program Chairman Morton H. Read at Bay State Film Productions in Springfield, Mass. (413 REpublic 4-3164).

Morton H. Read
Chairman, 94th Program

Outline of Program

Sunday
10:00–4:00 Registration

Monday
8:30 Registration
9:00 Photography in Medicine
12:15 Get-Together Luncheon—Guest Speaker
2:30 Photography in Medicine
8:00 Photography in Medicine

Tuesday
9:00 Laboratory Practice
2:00 8mm/Small Format Film
8:00 Presentation of Awards

Wednesday
9:00 Equipment Papers and Demonstrations
2:00 Sound Recording

Thursday
9:00 Instrumentation and High-Speed Photography
2:00 CONCURRENT SESSIONS
Motion Pictures, Television and Education
Instrumentation and High-Speed Photography
8:00 Motion Pictures, Television and Education

Friday
9:00 TV Engineering Developments; Space Technology
2:00 Cont'd

Association of Cinema Laboratories

Fall Meeting, October 12, 1963
Somerset Hotel, Boston

8:00 Breakfast Meeting — ACL Board of Directors
10:00 Meeting of ACL Members
12:15 Luncheon
1:30 Equipment and Techniques Forum
Presentations on new and modified equipment and techniques of interest to film laboratory personnel. Brief talks by manufacturers. (This Forum is open to SMPTE members.)
6:30 Reception and Dinner
Presentation by *Industrial Photography* of its fifth annual industrial film awards.

SUNDAY—OCTOBER 13

10:00–4:00 REGISTRATION

MONDAY—OCTOBER 14

8:30 REGISTRATION

9:00 PHOTOGRAPHY IN MEDICINE

Contrast and Detail Perception in Television and Cine Systems for Medical Fluoroscopy

E. W. WEBSTER and R. WIPFELDER, Dept. of Radiology, Massachusetts General Hospital, Boston

Following the advent of image-intensifier tubes with high gain, several systems have been developed over the past 10 years for cine recording of x-ray examinations. The two principal systems available commercially utilize (a) a motion-picture camera recording directly from the image intensifier (cinéfluorography) and (b) a motion-picture camera recording from a kinescope displaying an image picked up on a closed-loop TV system (kinefluorography). A test system has been developed for comparing the image quality presented in any fluoroscopic system. The system measures the limits of contrast and detail which may be perceived in a moving image for a given x-ray dose. In particular, comparisons are presented showing the performance under similar conditions of cine- and kinefluorography (the latter employing an 837-line image-orthicon system) and indicate a better performance for the former system.

The Potentials and the Application Possibilities of a Television X-Ray Image Storage Apparatus

GEORGE BERCI, M.D., University of Washington, School of Medicine, Seattle, Wash.

The introduction of the x-ray image intensifier opened a new epoch in radiology. A further step was to connect the image intensifier to a television camera and to display the x-ray image on a monitor. But this demonstration is possible only for the period of radiation. There are many applications in the medical field in which a still x-ray picture would satisfy the condition; therefore an apparatus was designed, made and put into the TV chain circuitry. In this case a short x-ray exposure with a very low energy output was required and the x-ray image was held up to 10 min for observation on the monitor *without further radiation*. The different aspects (resolution, contrast, etc.) as well as the applications in the clinical field (remarkable reduction in radiation hazard and immediate availability of the image) are outlined. (To our best knowledge this is the first system of this kind used in the medical field.)

A Television X-Ray Image Amplifier

R. BRIAN HOLMES, M.D., Toronto General Hospital, Toronto, Ont., Canada; and ROY LIGGINS, X-Ray and Radium Ltd., Don Mills, Ont., Canada

Increasing use is being made of television for medical x-ray diagnosis by amplifying the fluoroscopic image. Both image-orthicon and vidicon tubes are used and both conventional and nonstandard scanning systems. The Marconi 12-in. field x-ray image amplifier, which uses 1024-line triple interlace scanning and a special $4\frac{1}{2}$-in. image orthicon, is described. This image amplifier permits both 70mm still film recording and 16mm kinescope recording. Examples of still and motion-picture radiographs are shown.

Image Amplification and Television for Medical Education

HENRY P. PENDERGRASS, M.D., Harvard Medical School, Cambridge, Mass.

Experiences with image amplification and television indicate the usefulness of this mode of instruction. It has been used for teaching both medical students and graduate physicians.

Research Documents for Psychotherapy

JACQUES D. VAN VLACK, Eastern Pennsylvania Psychiatric Institute, Philadelphia

Producing sound motion pictures for research in human relations calls for two essential considerations: the achievement of maximum cinematographic quality and a minimum of interference with the human relationship. Film clips and slides illustrate equipment modifications and set designs used in fulfilling these considerations. Naturalistic behavioral research is facilitated by these innovations.

12:15 GET-TOGETHER LUNCHEON

Guest Speaker

George W. Goddard,
Brig. Gen. (Ret.) USAF,
Special Assistant
to the President of Itek Corp.

MONDAY AFTERNOON

2:15 BUSINESS MEETING

2:30 PHOTOGRAPHY IN MEDICINE

Stereocineradiography

MAJIC S. POTSAID, M.D., Massachusetts General Hospital, Boston

A radiographic presentation of patient kinetics incorporating the three dimensions of space with time (motion) as a fourth dimension would yield valuable information for diagnosis. Basic physical principles of stereo x-ray movie-image production and some concepts of depth perception serve to introduce the main subject as well as to bring out a few of the problems encountered in the design of a practical 4-D system. Several solutions that have been tried are shown and their limitations discussed. A new and most promising approach is presented.

Endoscopic Photography Through the Fiberscope

BASIL I. HIRSCHOWITZ, M.D., University of Alabama Medical Center, Birmingham, Ala.

The use of fiber optics in the construction of an instrument to examine the upper gastrointestinal tract has supplied a system particularly well suited to photography. The light transmission is adequate for color photography without any additional illumination and without modifying the instrument in any way. Motion pictures and still photographs have been made. An example of color motion picture is shown.

X-Ray Time-Lapse Studies of Living Bone

HOWARD J. BARNHARD, M.D., Department of Radiology, University of Arkansas, Little Rock, Ark.

Time-lapse studies have long been successful for observations made of plants, or through the microscope where immobilization of the subject has not been a problem. A mechanical means has been developed for accurately repositioning the foreleg of a dog over a period of weeks or months. During this time, interval radiographs are made and subsequently photographed in sequence on motion-picture film.

Time-Lapse Motion-Picture Studies of Living Cells in Division

SHINYA INOUE, Dartmouth Medical School, Hanover, N.H.

Advances in Polarized Light Microscopy

SHINYA INOUE, Dartmouth Medical School, Hanover, N.H.

The Technical Problems in Endoscopic (Medical) Cinematography

GEORGE BERCI, M.D., University of Washington, School of Medicine, Seattle, Wash.

During endoscopic examinations of hollow organs (e.g. lung, bladder, etc.) a small tube or optic is introduced into the cavity for observation. It became evident that a photographic documentation is superior to a description. Furthermore, functional disorders (movements) cannot be recorded by a still picture. In this case a motion-picture record is the method of choice. Using 16mm (commercial) cameras, the weight, size and sterility problems interfere with the medical conditions. A miniature 16mm cine-camera was designed and made weighing 850 grams including lens and mirror-shutter viewer, with the size and form of a grip. The film magazine, motor, etc., are behind the examiner (camera man) and the film travels in a flexible remote film transport mechanism to the handle (camera). The usefulness of this camera is demonstrated.

A Miniature Television Camera for Endoscopic (Medical) Purposes

GEORGE BERCI, M.D., University of Washington, School of Medicine, Seattle, Wash.

The shortcomings of endoscopic examinations (viewing through a small monocular eye-piece, etc.) are well known. It was obvious that television technique can offer some advantages. Orthicon cameras are excluded because of size and weight. Even vidicon cameras are too heavy to use without a counter-balancing system. Therefore, a camera was designed and made (120 mm in length, 45 mm in diameter and 350 grams in weight) to suit the medical conditions. The different aspects (resolution, contrast, etc.) are discussed (in comparison with a 1-in. vidicon camera) and the applications (bronchoscopy, laryngoscopy, oesophagoscopy, etc.) are demonstrated.

MONDAY EVENING

8:00 PHOTOGRAPHY IN MEDICINE

A Film: "Microelectrophoresis: The Fabrication and Use of the Five-Barrel Microelectrode"

HENRY JAMES COLE, Motion-Picture Photographer, National Institutes of Health, Bethesda, Md.

The film has three sequences: construction, preparation, and experimental application of a device for detecting electrical activity from individual nerve cells while administering chemical substances electrophoretically upon the exterior surface of the nerve cell. A 16mm color with sound film running approximately 20 minutes, *Microelectrophoresis*, has animation sequences to explain each stage of the technique.

The film was produced by the Medical Arts and Photography Branch of the National Institutes of Health for Dr. Gian C. Salmoiraghi, Chief of the NIH Neurophysiology Section, for presentation by invitation at the teaching seminar of the International Brain Research Organization (UNESCO) in Warsaw last May.

Cinegastroscopy

HENRY COLCHER, M.D., Columbia-Presbyterian Medical Center, N. Y.

High-Speed Photography of Eye Circulation: Pt. I Medical—Pt. II Engineering

ROE E. WELLS, M.D., Peter Bent Brigham Hospital, Boston and HAROLD E. EDGERTON, Massachusetts Institute of Technology, Cambridge, Mass.

TUESDAY MORNING—OCTOBER 15

9:00 LABORATORY PRACTICE

Some Aspects in the Design of a 16mm Editing Machine and a Combined 35mm/16mm Film Cleaner/Waxer

JOHN J. RIGBY, Robert Rigby, Ltd., London, England

Two machines have been designed, one for editing 16mm film and the other for cleaning and waxing 35mm and 16mm film stock. The editing machine contains in one unit facilities for picture cutting, optical/magnetic track laying and projection of married prints. The machine film cleaner/waxer has been designed to extend film life, particularly that of 16mm, and to protect the negative. Design problems are discussed and construction of both machines is described.

Rapid Processing of a Panchromatic Negative Film by the Application of a Viscous Monobath

G. J. JOHNSTON, Research Laboratories, W. H. BAHLER, Film Emulsion Div., and J. C. BARNES, Research Laboratories, Eastman Kodak Co., Rochester, N.Y.

A black-and-white camera negative film-monobath processing system has been designed for use in the Eastman Viscomat Processor. Processing of the film is accomplished by application of a thin layer of viscous monobath at 130 F in an atmosphere saturated with water vapor. Operating at a machine speed of 18 ft/min, the entire process takes approximately two minutes, dry to dry. The new film has a speed-graininess level comparable to Eastman Double-X Panchromatic Negative Film. The photographic quality obtained with the system compares favorably with that provided by conventional processing.

A Method for Converting Subtractive Timing and Color Balance Printing Data to Additive Printer Settings

FREDERICK F. H. DOBBS, National Film Board, Montreal, Que., Canada

In introducing additive color printers to a laboratory where the subtractive system has been used for many years, it has been found practical and highly satisfactory to convert timing and color balance data by means of a single chart containing a few reference charts.

Step Scale Metrics and Quantitative Exposure Determination in Motion-Picture Engineering

C. D. WEST, Polaroid Corp., Cambridge, Mass.

The efficiency and accuracy of quantitative exposure determinations are limited by the efficiency and accuracy of the physical metrics against which the individual exposure quantities (e.g. film characteristic, light, lens aperture, shutter time-interval) are measured, and by means of which the measurements are combined, which is ordinarily by graphical means. The standard metrics for the exposure quantities is in effect a nominal base-two metrics which appears to reflect mainly the interests of the arts of still photography. A metrics for these quantities defined on the exact base-ten and embodied in the A and D step scale patterns as specified before meetings of other societies (SPSE, OSA) is claimed to go beyond existing standards in attributes taken for granted almost everywhere else—metrical efficiency, accuracy, economy, commensurability with other standardized metrics, and the like. Conceivably the step scale metrics corresponds better to the more exacting exposure requirements of motion-picture and telefilm engineering than the existing metrical standards.

Gevacolor Positive T953

LOUIS A. MEEUSSEN, Gevaert Co., Antwerp, Belgium

Gevacolor Positive, introduced in Europe in 1947 and designated T951, was followed in 1954 by T952 and by T953 in 1958. T953, field tested in Europe since 1958, was available in the United States this year. A characteristic common to the three types is the use of color couplers rendered fast to diffusion by attachment to the molecules of an alkyl chain of sufficient length. The first type had a classical structure: *bottom layer*, red and blue sensitive, cyan coupler, silver bromide; *middle layer*, green and blue sensitive, magenta coupler, silver bromide; *yellow filter layer*, colloidal silver; and *top layer*, blue sensitive, yellow coupler, silver bromide.

In T952 and T953 an inversed structure is used to improve definition: *bottom layer*, blue sensitive, yellow coupler, silver bromide; *middle layer*, red sensitive, cyan coupler, silver chloride; and *top layer*, green sensitive, magenta coupler, silver chloride. In T953 definition has been further improved by the use of magenta and cyan dyes, which disappear in the processing, and by the use of a removable carbon black antihalation layer.

This paper includes descriptions and demonstrations of the spectral sensitivity curves of the three layers; the spectralphotometric curves of the dyes used; the sensitometric curves resulting from gray, red, green and blue exposures; and cross sections of the three types of Gevacolor Positive. A description of the processing sequence is given in full detail, and a print on Gevacolor positive is shown to demonstrate the capabilities of the material discussed above.

Metro-Kalvar Motion-Picture and Television Film

NOEL R. BACON, Metro-Kalvar, New York

A new film product, produced for black-and-white "release printing" of motion-picture and television film productions, is soon to be available along with its printing-processing equipment. Metro-Kalvar's release printing stock has no grain, requires no darkroom or chemical solutions, renders superior resolution, and enjoys good sensitometric characteristics required of this utilization. The characteristics of this new film product and the advantages in its use are set forth.

Techniscope

WADSWORTH E. POHL, Technicolor Corp., Hollywood

The Techniscope system of photography is based on the use of 2-perforations of negative height and spherical lenses. The advantages and disadvantages of this system are discussed, together with the kinds of prints which can be made for various normal usage. A film demonstration is included.

Comparison of Projected Images

HAVEN FALCONER, Metro-Goldwyn-Mayer, Inc., New York City

In connection with a venture that involves projection of the same 16-mm film in theaters, in schools and over television, interesting comparisons have been made of the different projected images under field conditions. Findings suggest that although much progress has been made in the development of standards, there is still room for educational programs in projection practices.

Optical Effects

MAURICE LEVY, Eastern Effects, Inc., New York

With emphasis on an "unusual" or "different" appeal the agencies and their writers with highly imaginative story boards in their efforts to get their sales ideas on film, offer real challenges to the modern optical effects house. The designing and manufacturing of special equipment and the creating of new methods and approaches to meet these challenges is considered normal operating procedure in producing the numerous photographic effects seen in theatrical productions, industrial films and television commercials. The latest specialized equipment, engineered and manufactured by the author, is described and the most advanced methods used to meet these challenges are discussed.

TUESDAY AFTERNOON

2:00 8MM/SMALL-FORMAT FILM

Photographic Variable-Area Sound Recording for 8mm Film

J. J. KUEHN, Sound Film Laboratory, Chicago

Tests have been made with a recorder built to produce variable area 8mm negatives suitable for high-speed duplication, using the 8mm standard picture format and the suggested 0.050 by 0.050-in. perforation, with the sound located between the outer edge of the perforations and the edge of the film.

8mm Variable-Area Sound: Key to an Audio-Visual Revolution

JOEL WILLARD, Joel Willard Productions, Chicago

A major advance toward reducing the cost of motion-picture prints, projection equipment and special viewing facilities has been made with the development of 8mm variable-area photographic sound that can be contact printed. A report on programs based on this development is offered as a companion paper to "Photographic Variable-Area Sound Recording for 8mm Film" by John J. Kuehn.

A Technical Program for 8mm Educational Sound Film

JOHN A. MAURER, JM Developments, Inc., New York

The writer's developments of 8mm photographic soundtracks, printers for producing 8mm sound films in quantity, and projectors for reproducing them are the first steps in a comprehensive program directed specifically toward meeting the needs of educational and industrial users of sound films. Since this project as a whole calls for much more than can be accomplished by any one organization, it will be presented at this time in its broader aspects in the hope that this will result either in general agreement and cooperative action within the industry or in the presentation of better concepts by others.

8mm Sound—"The Film in Education"

NAT C. MYERS, JR., Fairchild Camera and Instrument Corp., Yonkers, N.Y.

Two years have passed since a major Eastern university sponsored a symposium to discuss "The 8mm Film in Education." Articles, papers, and books flowed from that conference predicting expanded use of film in education as a result of the introduction of 8mm sound. A review of

the accelerated pace of change in education seeks to evaluate the effects of concurrent explosions in population, information and technology. 8mm film is viewed in this context of educational change and the predictions of the past are recalled and re-evaluated.

8mm Test Film Story

GEO. W. COLBURN, Geo. W. Colburn Laboratory, Inc., Chicago

A test film has been made for 8mm projectors to check steadiness, alignment, weave, travel ghost, resolution and framing. Described are the steps necessary to make the original chart, tools to make the chart, and selection of a suitable lens for a camera which had to be designed and built for this special purpose.

8mm Sound — A Review of Progress

R. G. HENNESSEY, Fairchild Camera and Instrument Corp., Plainview, L.I., N.Y.

Introduced to the American market in Spring 1960, 8mm magnetic sound now offers a record of progress in both consumer and industrial application. Just as 16mm, now professionally accepted, was labeled "sub-standard" during its early years, 8mm has many questions to answer. Some have already been disposed of and others remain. A review of the equipment available from 1960 until now provides a yardstick of the rate of change in utility and performance which is indicative of the significant potential this new medium offers.

Magnetic and/or Optical Sound for 8mm Films

HANS F. NAPFEL, Fairchild Camera & Instrument Corp., Plainview, L.I., N.Y.

The wide use of 8mm sound projectors in the industrial field created a demand for large quantities of 8mm release prints; consequently, different duplication techniques and optical sound have been proposed. Obtainable sound quality, release print costs, and film life of both sound systems are compared, and sound films are demonstrated.

The Challenge Offered and the Responsibility Imposed Upon Motion-Picture Professionals by Mass Utilization of 8mm Sound Film

F. BORDEN MACE, Heath deRochemont Corp., Boston

A much more ambitious effort and much higher standards than ever before are demanded from motion-picture engineers, producers, and users if the full potential offered by mass production and utilization of 8mm sound films is to be realized.

TUESDAY EVENING

8:00 PRESENTATION OF AWARDS

SMPTE President Reid H. Ray will preside over the Awards Program during which the chairmen of awards and honors committees will give the citations.

Feature of the evening will be an informal talk by Dr. Arthur C. Hardy, Professor Emeritus of Optics and Photography, Massachusetts Institute of Technology. Dr. Hardy, who will receive the Society's chief honor, the Progress Medal Award, has been many times honored for his achievements in fields of optics, motion pictures and three-color photography.

The program of honors is:

Journal Award to

Robert L. Lamberts for "Application of Sine-Wave Techniques to Image-Forming Systems"

Honorable Mention to

Walter Bach for "Magnetic-Striping 'Azimuth-Plateau' Effect on Frequency Response of 16mm and 8mm Film: An Engineering Survey"

J. S. Courtney-Pratt for "Image Converter Tube Photography"

E. I. du Pont Gold Medal Award to

Morton Sultanoff

Herbert T. Kalmus Gold Medal Award

Alex Quiroga

David Sarnoff Gold Medal Award

Henry N. Kozanowski

Progress Medal Award

Arthur C. Hardy

WEDNESDAY MORNING—OCTOBER 16

9:30 EQUIPMENT PAPERS AND DEMONSTRATIONS

EG&G's New Lite-Mike *(Demonstration)*

JIM HERON, Edgerton, Gerweshausen & Grier, Inc.

Professional Sun Gun Lighting Equipment *(Demonstration)*

EDWARD C. GILCHRIST, Photolamp Div., Sylvania Electric Products, Inc.

Vanguard Motion Analyzer *(Demonstration)*

DICK FREEBORG, Traid Corp., Encino, Calif.

New Arri 16 ultra-fine, extra lightweight Fiberglas blimp for use interchangeably with Arri 16 and Arr 16M *(Demonstration)*

VICTOR JAMES, Arriflex Corp. of America, New York

Graph-check sequence camera *(Demonstration)*

HY SHAFFER, Smith's Photo, Boston, Mass.

WEDNESDAY AFTERNOON

2:00 SOUND RECORDING

Synthesis and Manipulation of Natural Sounds in Electronic Music for Films

MYRON SCHAEFFER, University of Toronto, Toronto, Ont., Canada

By analyzing the spectral components of natural sounds such as bells, gongs, voices, etc., and then synthesizing them into constant-tone loop material, they can be used as the basis of electronic musical composition to create various moods without wandering too far away from the sounds to which present audiences have been conditioned.

High-Speed 8mm Magnetic Multiple Sound Dubber

IRVING POSLUNS and BARRY LUCKING, Edward Productions, Ltd., Montreal, Que., Canada

An 8mm high-speed magnetic multiple sound dubber has been designed as the result of two years of research and development, with speed and economy as major considerations. A machine has been built capable of recording two soundtracks on double 8mm striped prints, one running forward and one running backward, both at twice the speed of 8mm sound film. The main problem encountered in designing the dubber was the high flutter-and-wow content in 8mm film, due to the greater number of sprocket holes. A demonstration film is shown.

Cross-Modulation Distortion in Present Recording Practice

JOHN A. MAURER, JM Developments, Inc., New York

Our standard method of measuring cross modulation distortion gives, for one chosen high frequency, the resultant of all effects in films and equipment which tend to shift the zero line of a recorded sine wave. Several of these effects are not independent of frequency; this explains why the standard test often fails to indicate the best printing exposure for a given soundtrack negative. Both materials and methods will have to be changed to produce variable-area recordings having really low distortion.

Viscous-Layer Processing of Variable-Area Sound Negatives

JOHN F. FINKLE, Research Laboratories, and ROBERT J. WILSON, Photographic Technology Div., Eastman Kodak Co., Rochester, N. Y.

Variable-area sound recordings made on Eastman Television Recording Film, Type 7374, can be processed with a viscous developer on the Eastman Viscomat Processor, Model 20. Specifications for the rapid process are described. The characteristics of variable-area sound negatives and prints that were processed with viscous-layer development are compared with the characteristics of conventional immersion-processed sound negatives and prints.

WEDNESDAY EVENING

6:45 COCKTAIL PARTY, BANQUET, DANCE

THURSDAY MORNING—OCTOBER 17

9:00 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY

Continued CONCURRENT SESSIONS, Thursday Afternoon

Applications of the High-Speed Focal Plane Shutter Camera to Explosives Research

T. P. LIDDIARD, JR.; S. J. JACOBS, U.S. Naval Ordnance Laboratory, Silver Spring, Md.; and B. E. DRIMMER, Bureau of Naval Weapons, Washington, D. C

A high-speed camera employing six focal plane shutter slits, phased one-sixth frame apart and writing six rows of images on two film tracks, has been developed. This camera is particularly suited for the study of detonation phenomena because of its continuous coverage, in time, for 216 frames, of at least some portions of the subject. The coverage feature minimizes the chance of failure to observe details of rapidly changing phenomena. The camera was intentionally designed to record the six rows of images on two film strips with the images of the three rows on each film phased one-third frame apart. In addition, the shutter apertures for each filmed group of images can be selected independently for flexibility in control of exposure. This camera has been used at framing rates up to 1.1 million frames/sec to record transient phenomena in the study of the growth to detonation in explosives subjected to mechanical shocks of known amplitude. Example records of these experiments are shown and discussed.

High-Speed Studies of Fractures of Brittle Materials

R. WAYNE ANDERSON, Dow Chemical Co., Midland, Mich.

Laser Applications

RICHARD SYKES, Douglas Aircraft Co.

A Camera Mount Utilizing Programed Mirror Rotation for Missile Tracking

L. E. DAVIDSON, Engineering Laboratories, Aberdeen Proving Ground, Md.

The usual photographic instrumentation for tests of low-flying missiles is inherently limited by usable fields of coverage or in capacity for tracking at high angular velocities. A camera mount has been developed which avoids limitations by using a rotating mirror to deviate the line of sight. The mirror motion is produced by a rotating cam which may be shaped to conform to various trajectory conditions.

A New Optical Compensator

EDWARD BAROCELA, Instruments Corp. of America, New York

A new optical motion compensator has been developed for use in motion-picture machines, particularly in high-speed cameras and in projectors for small-format film. The compensator consists of a single body of transparent optical material bounded by a plurality of convex surfaces, the centers of curvature of which lie in a plane perpendicular to the axis of rotation. In operation, these surfaces act as a series of lenses that cross the optical axis of the system in a direction parallel to that of the film, thereby displacing the image in synchronization with the movement of the film frames.

This new compensator is free from the astigmatic distortions found in rotating prism systems and the tracking error is negligible, therefore no shutters are required for proper operation. The exposure time is equal to the reciprocal of the frame frequency and apertures in the order of $f/1.5$ are possible with very good resolution.

A Photographic Study of Optical and Infrared Masers

T. PAVLISCAK, Bell Telephone Laboratories, Murray Hill, N.J.

THURSDAY AFTERNOON

2:00 MOTION PICTURES, TELEVISION AND EDUCATION

Developments in School Television Programing

ALAN R. STEPHENSON, The 21-Inch Classroom, Watertown, Mass.

Incorporating research findings in its own field, in addition to those drawn from experimental work in programed instruction and teaching machines, instructional television has moved to involve the student as a participant in the lesson rather than as exclusively a viewer of it. The acceptance of these principles and techniques, and of television for classroom use in general, is perhaps best illustrated by the large number of voluntary viewers to be found in southeastern New England.

What is Tele-Lecture?

MICHEL BEILIS, American Telephone and Telegraph Co., New York

Modern techniques of broadening the horizon of learning include field trips, motion pictures, television, sound recordings, and a variety of audio-visual tools. In America and Sweden an increasing number of educators are accomplishing these goals through an imaginative use of the long distance telephone call. Lectures by expert teachers, statesmen, and scholars, located all over the country and abroad, are being brought into the classroom by long distance conference calls. The voices are heard through amplified telephone speakers in the classroom. Talk-back facilities are provided so that students can participate in question-and-answer discussions with the speaker. Large-screen and multiple-screen visuals are used to illustrate these telephone lectures. The result is an illustrated lecture-discussion with the immediacy and stimulating qualities of "in person" instruction and audience participation.

Parlons Français and the Training of Nonspecialist Classroom Teachers for Follow-Up in French

ROBERT W. CANNADAY, Jr., Modern Language Project, Boston

Parlons Français is a system, for teaching French to American elementary school children, based on the proposition that it is possible to conduct such teaching effectively even when the classroom teacher is totally or partially inexperienced in the language. Filmed and video-taped lessons of high linguistic, cultural, and technical quality help make this proposition valid. Classroom teachers, whose follow-up activity is essential to the success of the course, are provided many aids: detailed teacher guides; special recordings containing pronounciation and structure exposition and drill; special filmed or video-taped teacher preparation programs; and workshop and consultant services. A 15-min film demonstrates the system.

Mobile Video-Tape Production for Educational Television

RUSS MORASH, WGBH, Cambridge, Mass.

It is generally believed that as funds become available, we can expect more educational television stations to acquire mobile video-tape units. With this development will come the need to define the limitations of operating such a unit within the framework of educational broadcasting. The experience of WGBH-TV in Boston with its mobile unit, and the way that producers at that station are using mobile video-tape are discussed.

THURSDAY EVENING

8:00 MOTION PICTURES, TELEVISION AND EDUCATION

New Developments in the Role and Scope of Instructional Television Overseas

THEODORE R. CONANT, Education Div., The Ford Foundation, New York

In view of the realities of the present century and the world-wide tide of change in curriculum and teaching methods, the need in many countries today for mass teaching aids is so pressing that instructional television can no longer be dismissed as a marginal luxury. The way it is employed to improve the overall quality of instruction varies sharply from country to country. In England, Europe, Japan and Canada a great deal of research, development and production has gone into exploring the ways in which the television medium can best be used for instructional communication. Sample programing is presented and discussed with emphasis on new and experimental techniques.

Location and Newsreel Motion-Picture Equipment

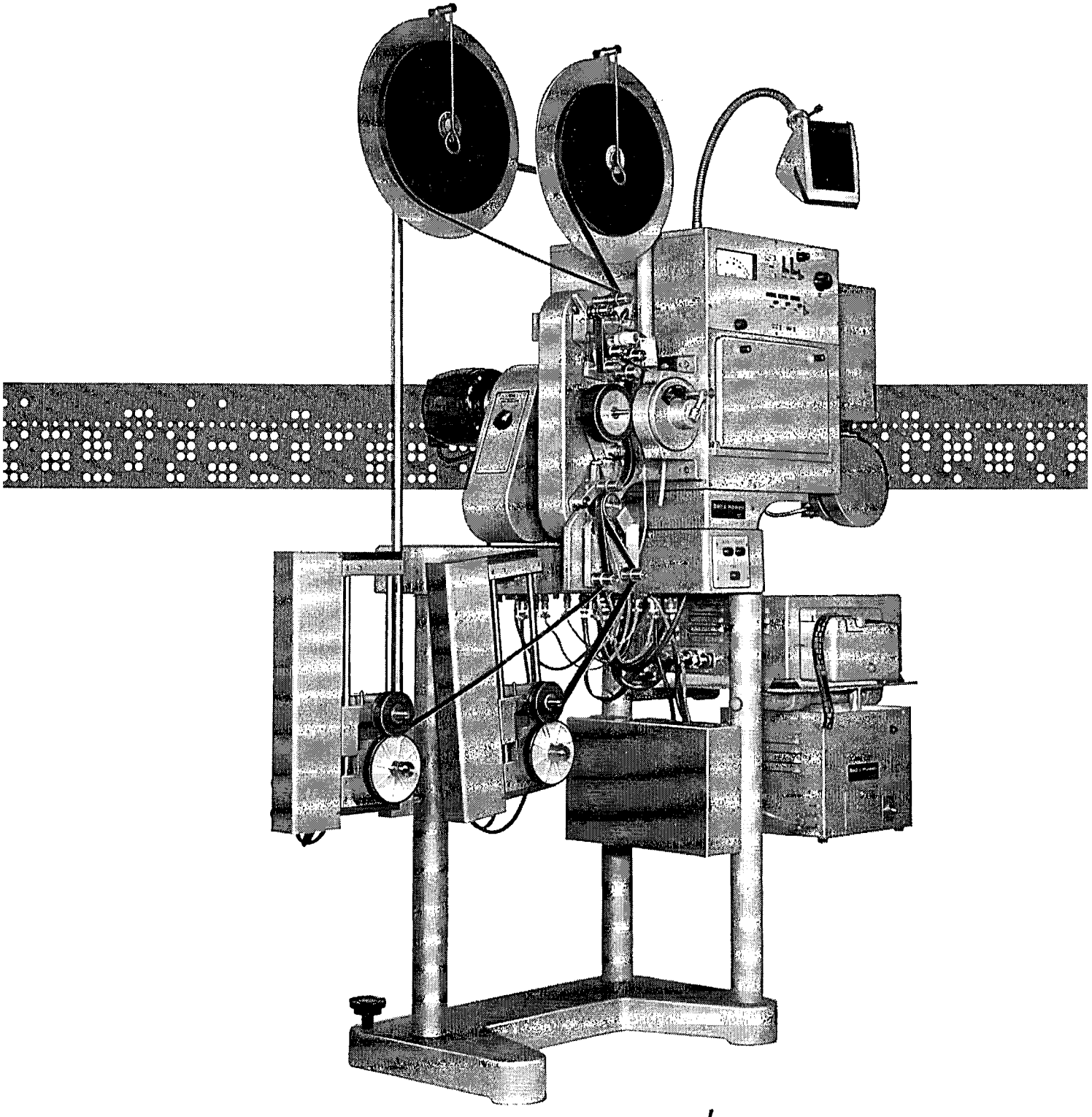
ROBINSON P. RIGG, Business Screen, London, Eng.

The developing nations of Africa, Asia and South America will use modern communications media to help them to catch up with Western intellectual and economic standards. Location and newsreel motion-picture equipment will play a big part in this work. Current designs of equipment and techniques in their use have developed in U.S.A. and Europe over the past sixty years against a background of centuries of manufacturing experience. Will the media specialists in the developing countries accept these designs and techniques or will they need designs custom-built to their particular requirements?

Audio-Visual Devices: Capabilities and Needs

JOHN FLORY, Eastman Kodak Co., Rochester, N. Y.

A survey of a cross section of educators and engineers indicates that because of the "piecemeal" evolution of today's audio-visual devices, schools have not been able to make the effective use of A-V techniques that the state of the art permits. Faced with an ever-increasing number of students and the mushrooming expansion of knowledge, the school must look to a systems approach to education—the integration of instructional materials.



HERE ARE SOME OF THE MODEL "C" FEATURES

■ Ability to make scene-to-scene color corrections ■ Six fade lengths (16-24-32-48-64-96) separately controllable by pre-punched program tape ■ Zero cut to allow extended scene printing ■ Over 2000-foot capacity ■ Single 1000-watt lamp proximity reflector type ■ Edge light printing separately controlled at aperture ■ Instruments internally illuminated ■ RF cue system available as accessory to supplement standard notch cue ■ Slow-start circuit to prevent film damage ■ Internal air pressure ■ Pre-wired for sound head installation ■ Automatic stop in case of negative break ■ Available accessories include: a tape checker-tape duplicator unit (6173C), 1000-watt rectifier (6160), 16mm, 35mm, 35/32mm soundheads, and RF cue kits (6395).

Other printers available:

Model "MB", Automatic Black & White Printer. This model does not include fader, which is available as an accessory.

Effective Visual Presentations

NORMAN E. SALMONS, Audio-Visual Service, Eastman Kodak Co., Rochester, N.Y.

The planning and producing of visual aids for effective technical presentations are completely reviewed. The planning phase utilizes continuity or storyboard cards containing a rough sketch of the visual, production notes, and a brief summary of the narration for that visual. Production of artwork covers legibility standards, standardization of art area for ease of preparation, copying, and filing. Examples are shown of simple but effective photographic techniques of apparatus and equipment.

FRIDAY MORNING—OCTOBER 18

9:00 TV ENGINEERING DEVELOPMENTS

Recent Developments of New Electronic Special Effects in Television Methods, Equipment and Demonstration of Results

ULRICH MESSERSCHMID, Institut f. Rundfunktechnik (IRT), Munich, Germany

By superposing suitable modulated signals on the deflection currents of a picture-generator, it is possible to obtain a multitude of different effects, for example, movements of the picture geometry in the rhythm of a piece of music. By means of the second method described in the paper all-directional outline pictures are produced by shaping the video signal. In order to obtain the horizontal outlines, a supersonic delay line is used for the vertical direction of differentiation.

Subjective Evaluation of Present-Day Broadcast TV Pictures

ROGER E. PETERSON, Jansky & Bailey, Consulting Engineers, Washington, D.C.

Television picture quality on most home receivers, as judged by the professional television engineer, is very limited and far below the present-day capabilities of the United States broadcast system. The reasons for this relatively low picture quality are discussed. Illustrated comparisons are made with the performance of an assumed ideal system. The basic types of picture degradations are categorized and the causes of each are detailed to enable both producers and viewers of broadcast television to make better use of the system and to compensate for its limitations under current technical and economic influences.

Simplified Operating Practices for Studio Cameras

J. A. FLAHERTY, CBS Television Network, New York

The film describes the practices employed by the CBS Television Network to obtain consistently high-quality results from 4½-in. image-orthicon cameras in everyday operation. The interrelationships of scene contrast, lighting, camera exposure, and object-to-image transfer characteristics are explained and demonstrated. Illustrated are practical methods which standardize some of the variables permitting simpler operation with more predictable high-quality results. Although 4½-in. cameras were used, the same basic principles relate to all image-orthicon cameras and, if properly employed, will improve the results from 3-in. cameras as well.

A Television Film Recorder for Field-Sequential Color and Standard Monochrome Signals

ROBERT A. CASTRIGNANO, Special Products Dept., CBS Laboratories, Stamford, Conn.

A novel television film recorder has been developed for closed-circuit medical demonstrations. The unit is designed for field-sequential color and conventional monochrome TV signal operation on either American or European standards. A uniquely designed color filter disc serves also as the film camera's shutter. For monochrome operation, the disc is removed and an internal camera shutter is employed.

Image-Orthicon Operation

EARL FARIS, American Broadcasting Co., Hollywood

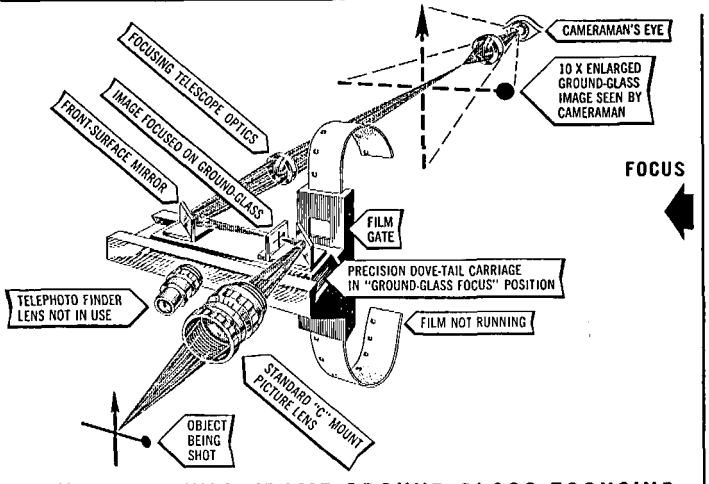
The critical, complex, little understood and controversial image-orthicon operation is further confused by the characteristics of the increasingly used 4½-in. tube. This study includes a partial investigation of the "saturated target" and "linear" modes of operation with a review that includes "redistribution" and "spurious signal" phenomena and a comparison between the commonly used 3-in. 5820 (7293 screen-mesh version) and the 4½-in. 7295. The various operating modes of the 7295, including the linear mode with its limited light-contrast capability that requires control of set reflectance and lighting, are explored.

Auricon

"SUPER 1200" CAMERA

with Full-Frame Reflex Ground-Glass FOCUSING OPTICAL SYSTEM

The unique and versatile features built into the 16mm Auricon "SUPER 1200" Sound-On-Film Recording Camera have prompted Producers and Cameramen to name the Super 1200..."Finest 16mm Sound Camera ever built!" This Camera is "Self-Blimped" for whisper-quiet Studio work, has 33 minutes of continuous film capacity, Variable-Shutter or Kinescope "TV-T" Recording Shutter, plus the combined "Rifle-Scope" Telephoto Finder and Reflex-Focusing Optical Systems illustrated below. Its only equal is another Auricon "Super 1200"...

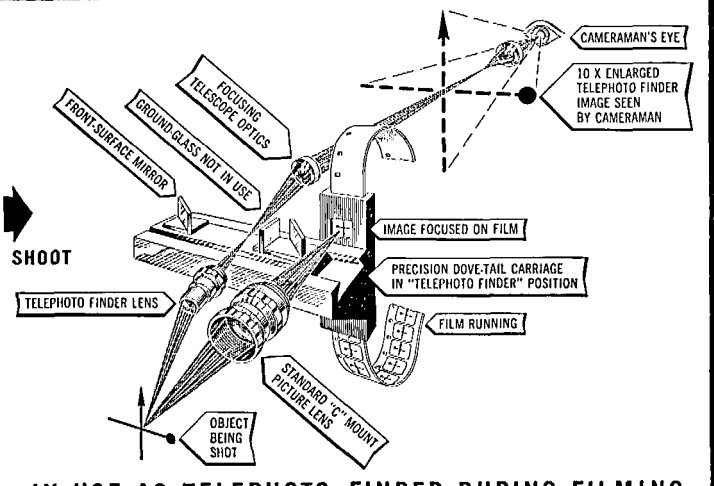


IN USE FOR FULL-FRAME GROUND-GLASS FOCUSING

"Super 1200" Reflex Ground-Glass Focusing-Frame indicates the field covered by any focal-length lens at all distances. A 10X enlarged Ground-Glass image is seen by the Cameraman, for needle-sharp critical focusing.

FOCUS

SHOOT



IN USE AS TELEPHOTO-FINDER DURING FILMING

No Camera-weight shift on tripod legs when moving from focus to film-shooting position with the "Super 1200." Camera-body does not shift to focus, or shoot film, as Optical-System Dove-Tail Carriage is only moving part!

THE CAMERA OF TOMORROW, HERE TODAY! ITS ONLY EQUAL IS ANOTHER AURICON "SUPER 1200"

FEATURES OF MODEL CM-74 CAMERA INCLUDE...

- "Rock-steady" picture and High-Fidelity Optical or "Filmagnetic" Sound-Track recorded on same film at same time, with "whisper-quiet" Camera and Sound Mechanism synchronously driven by precision-machined Nylon gears.
- Auricon all-transistorized "Filmagnetic" Sound-On-Film Recording System can be used with the "Super-1200" Camera (with or without Optical Sound-On-Film also installed in the Camera).
- "Super-1200" is Self-Blimped for completely quiet Studio use.
- Built-in Electric Camera Heater with automatic Thermostat-Control, provides reliable cold-weather Camera operation.
- Geared Footage and Frame-Counter with built-in neon-glow indirect light.
- Two independent Finder systems (in addition to Reflex Ground-Glass Focusing through the Camera lens); a brilliant upright-image Studio Finder, plus the "Rifle-Scope" precision-matched Telephoto-Finder.
- 600 and 1200 ft. film Magazines available. Up to 33 minutes of continuous filming.
- During picture exposure, your film runs through the Auricon "Super-1200" Film-Gate with the light-sensitive film emulsion accurately positioned on jewel-hard Sapphire Surfaces, an exclusive Bach Auricon feature (U.S. Patent No. 2,506,765). This polished Sapphire Film-Gate is guaranteed frictionless and wear-proof for in-focus and scratch-free pictures, regardless of how much film you run through the Camera!
- Priced from $4,149.00 for Double-System Recording; choice of "C" Mount lenses and Carrying Cases extra.
- Sold with a 30 day money-back Guarantee and One Year Service Guarantee; you must be satisfied! Write today for your free copy of the 74 page Catalog describing all Auricon Equipment.

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CINE VOICE II	AURICON "PRO-600 SPECIAL"	AURICON PRO-600	AURICON SUPER-1200
100 ft. Runs 2¾ min.	400 ft. Runs 11 min.	600 ft. Runs 16½ min.	1200 ft. Runs 33 min.
$967.00 & up	$1295.00 & up	$1456.25 & up	$4,149.00 & up

AURICON...THE PROFESSIONAL CAMERA • *STANDARD OF THE 16MM SOUND INDUSTRY SINCE 1931*

Secondary Electron Conduction in Low-Density Targets for Signal Amplification and Storage in Camera Tubes

G. W. GOETZE and A. H. BOERIO, Westinghouse Research Laboratories, Pittsburgh, Pa.

The concept of minimum detectable contrast is used to describe the capability of an imaging device to discriminate between a signal and the fluctuations of the background. For a given optical system, photocathode illumination and efficiency, the minimum detectable contrast is reduced by either increasing the integration time, the photoelectron utilization efficiency or both. The maximum integration time is ultimately limited by the electrical storage capacity and the resistivity of the target. The photoelectron utilization efficiency depends on both the total system gain and the statistical fluctuations in gain, especially the gain fluctuations of the first interstage. However, gain fluctuations become significant only in those cases where the system gain is approximately equal to or greater than the gain required to see photoelectron scintillations.

A low-density deposit of an insulator, which exhibits high gain and high resistivity, depending primarily on free secondary electrons for conduction, is described. This effect of Secondary Electron Conduction (SEC) and its application to camera tube targets is discussed, and comparison is made with Electron Bombardment Induced Conductivity (EBIC) targets. The performance of the SEC target has been measured and evaluated with respect to conventional television requirements as well as the requirements of low light level imaging.

Design Parameters for a Portable Broadcast Television Tape Recorder

DONALD A. HORSTKORTA, Machtronics, Mountain View, Calif.

The widening scope of remote telecasting has emphasized the need for a truly portable video recording device. Such a unit, to be acceptable, must offer the utmost in mobility, operational simplicity and complete dependability with a minimum of adjustment and attention. Stable operation in the spectrum of environments found in remotes and over a wider range of power source fluctuations pose some of the most difficult engineering hurdles to be cleared. It has been the goal in developing the MVR-15 to meet these stringent requirements.

The Correction of Differential Phase Distortion in Color Video-Tape Recording

Z. TOYOTA, M. MIYAGISHIMA, K. MURAKAMI and T. OGAWA (to be read by T. KIMURA), Nihon Hoso Kyokai (Japan Broadcasting Corp.) Tokyo, Japan

At present, NHK produces about 20 color video-tape programs, each for a total of about 7½ hr. Efforts are made to improve the quality of color VTR. One of the deteriorations of the picture quality of color video tape is a differential phase distortion caused by the resonant character of the video head. This differential phase distortion deteriorates the color tone of the picture by making the bright part of the face-tone pink and the dark part green. Although this distortion differs according to the video head used, yet it does not change so much, regardless of the kind of video head used. It is 60° to 70° at white level, if the black level is used as the basis of signal. As a measure to correct this, NHK has devised a differential phase corrector. This corrector can control the differential phase within 10° at any level, and thus can greatly improve the picture quality of color video-tape recording.

A New Concept in Studio Lamps

ARTHUR A. BOTTONE and GEORGE G. PARAGAMIAN, Lamp Div., Westinghouse Electric Corp., Bloomfield, N. J.

A new all-glass wide-beam floodlamp for professional or amateur studio, stage and cinematography lighting has been designed for compactness and portability. Each lamp is a highly efficient integrated lens-reflector system which affords a fresh optical system with each lamp replacement. The uniform light distribution provides more footcandles of light per watt than conventional systems and with less heat on the set or subject area.

Boston Equipment Exhibit

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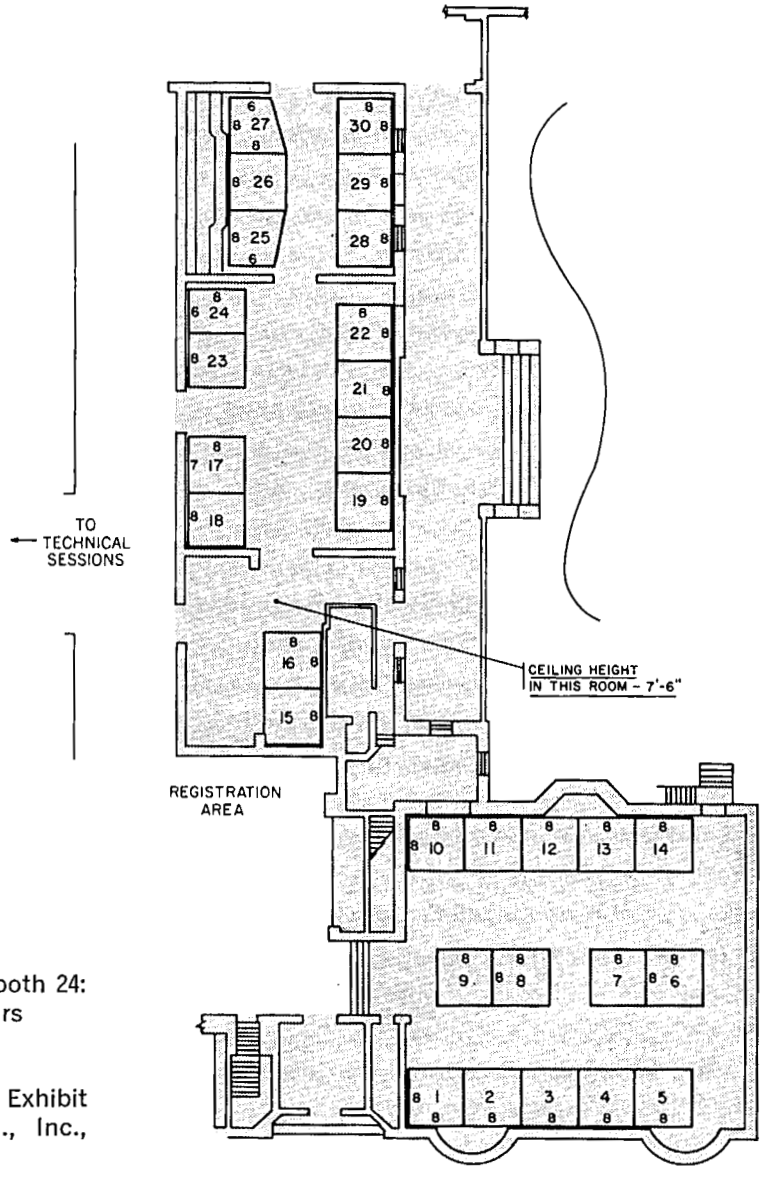

All booths $350 (except booths 17, 25, 27; $325; Booth 24: $300) Less 10% for SMPTE Sustaining Members

Orders for booths are now being taken by the Exhibit Chairman, Lester E. Bernd, Cine Service Labs., Inc., 51 Kondazian Street, Watertown 72, Mass.

Exhibit open October 14–17

SOMERSET HOTEL, BOSTON

94th SMPTE

Technical Conference and Equipment Exhibit

FRIDAY AFTERNOON

2:00 SPACE TECHNOLOGY

The Stratoscope II Television System

L. E. FLORY, W. S. PIKE, J. M. MORGAN and L. A. BOYER, RCA Laboratories, Princeton, N.J.

Stratoscope II is a large and complex balloon-borne astronomical telescope operated in the stratosphere by radio command. This paper describes the television system developed for this equipment to permit the astronomer to see through the telescope for the purpose of acquiring the astronomical objects to be studied. Results of the instrument's first flight are briefly described and plans for future flights outlined.

Surveyor Television Subsystem

THOMAS B. VAN HORNE and FRANK J. WOLF, Aerospace Group, Hughes Aircraft Co., Los Angeles

The television system for the A-21 spacecraft employs two cameras for visual surveillance of the lunar surface and a third camera for obtaining approach pictures of the Moon during the descent phase. The lunar surface surveillance cameras employ variable focal-length lenses for wide- or narrow-angle capability. Scanning is accomplished by means of moving mirror assemblies mounted on each of the two cameras. Both surveillance cameras include a filter wheel with clear, red, blue and green color segments. The third or approach camera utilizes a fixed focal-length lens without color filters.

Each camera contains the electronic circuitry necessary to process the image formed on a vidicon tube. The modes of operation, normal and emergency, are provided in each survey camera, whereas the downward-looking approach camera has normal mode only. Under normal operation, single-frame pictures can be produced at a maximum rate of one every 3.6 sec. The sweep circuits in the camera free-run continuously. Shutter operation and picture readout, including identification code, are initiated by command from Earth at the proper time in the sweep cycle and synchronized by video logic circuitry in each camera. Prior to a succeeding shutter and readout cycle, time is allotted for vidicon erasure, effected by the continuous sweeping of the tube, and if required or desired, for operation of mirror and lens mechanisms by Earth commands. Control circuitry for the mechanisms is also included in each camera.

Emergency mode operation is similar to normal mode except for a reduction in sweep rate and open-shutter operation. In this mode, the picture rate is reduced to one in about 62 sec. The emergency mode will be used if a failure in the communications link requires the use of the omnidirectional antenna.